[7590-01-P]

NUCLEAR REGULATORY COMMISSION

10 CFR Part 50

[Docket No. PRM-50-108; NRC-2014-0171]

Fuel-Cladding Issues in Postulated Spent Fuel Pool Accidents

AGENCY: Nuclear Regulatory Commission.

ACTION: Petition for rulemaking; notice of docketing.

SUMMARY: The U.S. Nuclear Regulatory Commission (NRC) has received a petition for rulemaking (PRM) from Mr. Mark Edward Leyse (the petitioner), dated June 19, 2014. The petition was docketed by the NRC on July 14, 2014, and has been assigned Docket No. PRM-50-108. The petitioner requests that the NRC make new regulations concerning the use of spent fuel pool (SFP) accident evaluation models. The NRC is not requesting public comment on PRM-50-108 at this time.

DATES: [INSERT DATE OF PUBLICATOIN IN THE FEDERAL REGISTER].

ADDRESSES: Please refer to Docket ID **NRC-2014-0171** when contacting the NRC about the availability of information for this petition. You may obtain publicly-available information related to this petition by any of the following methods:

- **Federal Rulemaking Web Site:** Go to http://www.regulations.gov and search for Docket ID **NRC-2014-0171**. Address questions about NRC dockets to Carol Gallagher; telephone: 301-287-3422; e-mail: Carol.Gallagher@nrc.gov. For technical questions, contact the individual listed in the FOR FURTHER INFORMATION CONTACT section of this document.

- **NRC's Agencywide Documents Access and Management System (ADAMS):**

You may obtain publicly available documents online in the ADAMS Public Documents collection at http://www.nrc.gov/reading-rm/adams.html. To begin the search, select "ADAMS Public Documents" and then select "Begin Web-based ADAMS Search." For problems with ADAMS, please contact the NRC's Public Document Room (PDR) reference staff at 1-800-397-4209, 301-415-4737, or by e-mail to pdr.resource@nrc.gov. The ADAMS accession number for each document referenced in this document (if that document is available in ADAMS) is provided the first time that a document is referenced. The petition, PRM-50-108, is available in ADAMS under Accession Number ML14195A388.

- **NRC's PDR:** You may examine and purchase copies of public documents at the NRC's PDR, Room O1-F21, One White Flint North, 11555 Rockville Pike, Rockville, Maryland 20852.

FOR FURTHER INFORMATION CONTACT: Daniel Doyle, Project Manager, Office of Nuclear Reactor Regulation, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001; telephone: 301-415-3748, e-mail: Daniel.Doyle@nrc.gov.

SUPPLEMENTARY INFORMATION:

I. The Petitioner.

Mr. Mark Edward Leyse (the petitioner) submitted this petition for rulemaking (PRM) as an individual. In Section II of the petition, "Statement of Petitioner's Interest," the petitioner explains that he disagrees with the conclusions of recent MELCOR simulations of boiling water reactor (BWR) Mark I spent fuel pool (SFP) accident scenarios. On December 23, 2013, Mr. Leyse submitted a PRM (ADAMS Accession No. ML14008A427) with similar requests. On

March 21, 2014, the NRC requested additional information to further clarify the petitioner's request (ADAMS Accession No. ML14023A743). On June 19, 2014 (ADAMS Accession No. ML14195A388), the petitioner responded to the request and resubmitted the petition with additional information. After evaluating the resubmitted petition, the NRC has determined that the petition meets the threshold sufficiency requirements for a petition for rulemaking under § 2.802 of Title 10 of the *Code of Federal Regulations* (10 CFR), "Petition for rulemaking," and the petition has been docketed as PRM-50-108. The NRC is not requesting public comment on PRM-50-108 at this time.

II. The Petition.

The petition requests that the NRC develop new regulations requiring that (1) spent fuel pool (SFP) accident evaluation models use data from multi-rod bundle (assembly) severe accident experiments for calculating the rates of energy release, hydrogen generation, and fuel cladding oxidation from the zirconium-steam reaction; (2) SFP accident evaluation models use data from multi-rod bundle (assembly) severe accident experiments conducted with pre-oxidized fuel cladding for calculating the rates of energy release (from both fuel cladding oxidation and fuel cladding nitriding), fuel cladding oxidation, and fuel cladding nitriding from the zirconium-air reaction; (3) SFP accident evaluation models be required to conservatively model nitrogen-induced breakaway oxidation behavior; and (4) licensees be required to use conservative SFP accident evaluation models to perform annual SFP safety evaluations of: postulated complete loss-of-coolant accident (LOCA) scenarios, postulated partial LOCA scenarios, and postulated boil-off accident scenarios.

The petition references recent NRC post-Fukushima MELCOR simulations of BWR Mark I SFP accident/fire scenarios. The petition states that the conclusions from the NRC's

MELCOR simulations are non-conservative and misleading because their conclusions underestimate the probabilities of large radiological releases from SFP accidents.

The petition states that in actual SFP fires, there would be quicker fuel-cladding temperature escalations, releasing more heat, and quicker axial and radial propagation of zirconium fires than MELCOR indicates. The petition states that the NRC's philosophy of defense-in-depth requires the application of conservative models, and, therefore, it is necessary to improve the performance of MELCOR and any other computer safety models that are intended to accurately simulate SFP accident/fire scenarios.

The petition claims that the new regulations would help improve public and plant-worker safety. The petitioner asserts that the first three proposed regulations, regarding zirconium fuel cladding oxidation and nitriding, as well as nitrogen-induced breakaway oxidation behavior, are intended to improve the performance of computer safety models that simulate postulated SFP accident/fire scenarios. The petition states that the fourth proposed regulation would require that licensees use conservative SFP accident evaluation models to perform annual SFP safety evaluations of postulated complete LOCA scenarios, postulated partial LOCA scenarios, and postulated boil-off accident scenarios. The petition states that the purpose of these evaluations would be to keep the NRC informed of the potential consequences of postulated SFP accident/fire scenarios as fuel assembles were added, removed, or reconfigured in licensees' SFPs.

Dated at Rockville, Maryland, this 30th day of September, 2014.

For the Nuclear Regulatory Commission.

Annette L. Vietti-Cook,
Secretary of the Commission.

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